



Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

JUL 10 2007

Mr. Juan Reyes, Director
U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Room 507
1310 L St, NW
Washington, DC 20005

Subject: Chemical Analysis of the MagChem 10 WTS 60 as supplied to the Waste Isolation Pilot Plant

Dear Mr. Reyes:

I am writing in response to your questions pertaining to the efficacy of the Magnesium Oxide (MgO) supplied to the Waste Isolation Pilot Plant (WIPP), and am including information provided by the vendor (Martin Marietta). Martin Marietta's stated goal is to provide an industrial source of MgO with a constant 98 to 98.5 % by weight of MgO. They have been using the current manufacturing process and feedstocks since the 1960's with excellent reliability of the MgO product.

The attached documents demonstrate the stability of the product, in terms of both the stability of the feedstock and of statistical data on the composition of the product. The MgO supplied to the WIPP is produced by Martin Marietta from two properties, and from two feedstocks: deep brines produced from the Filer sandstone and Dolime from a quarry in Ohio. Attachment 1 describes the Filer sandstone and the brine produced from it. A stratigraphic column for Michigan including this sandstone is appended to this attachment. Attachment 2 gives information on the chemistry of the brine feed, while Attachment 3 gives chemistry of the Dolime feed from the Woodville, OH quarry. Attachment 4 gives a statistical summary of the chemistry of the product (MagChem 10 WTS 60) for two one year periods (2005 and 2006-7). A summary of the information provided by Martin Marietta follows:

1. Brine Source

- **Brine Source for MagChem 10 WTS 60**

The Filer Sandstone in the state of Michigan is the source of the brine feed stock used in the production of MagChem 10 WTS 60. Attachment 1 describes the Filer Sandstone, which is found at a depth of 1,774 to 2,120 feet below sea level. A stratigraphic column for Michigan is appended to this attachment. The brine reservoir extends over 300 square miles, with an average thickness of approximately 70 feet. Martin Marietta operates over a 40 square mile area of the brine

reservoir and has the ability to expand operations six miles north and south of its current locations. Martin Marietta estimates the lifetime of their brine sources as 50+ years.

- **Brine Feed Chemistry Summary 2004-2007**

Attachment 2 is a summary of the brine feed chemistry, including the concentrations of CaCl_2 , MgCl_2 and NaCl in grams/liter along with the pH and specific gravity of the brines. These data were collected over a three and a half year timeframe. These results show standard deviations for MgCl_2 ranging from 3 to 5 grams/liter on annual average concentrations of 107 – 110 gm/liter. Martin Marietta mixes brines from several wells to maintain uniformity of the concentrations in the brine feedstock.

2. Dolime Feed Chemistry Summary 2004-2007

- A second Martin Marietta property in the state of Ohio produces the Dolime, which is also used in the production of MagChem 10 WTS 60. The Woodville, OH quarry covers approximately 1500 acres. Production of dolime has been ongoing since 1960 with the current reserves covering approximately 500 acres. Attachment 3 shows that the average MgO concentration in the Dolime is 40.4% by weight over 333 data points with a standard deviation of 0.214%. These data points were gathered over the time period from January 23, 2004 through June 7, 2007. Martin Marietta estimates the lifetime of their dolomitic lime sources as 45+ years with additional reserves available at non-secured locations.

3. Statistical Summary MagChem 10 WTS 60 Final Product

- Martin Marietta performed an assay of the final MgO product for the WIPP, denoted as MagChem 10 WTS 60. These assay results are for June 1, 2006 through May 31, 2007 and for December 1, 2004 through December 1, 2005. As shown in Attachment 4, the weight percent of Magnesium (as MgO) on an ignited basis is 98.4788% and 98.4808%, respectively, for the two time periods. The corresponding standard deviation is 0.085% and 0.083%, respectively. It follows that:
 - a) The purity of MagChem 10 WTS 60 has not varied significantly within each of the 12 month periods.
 - b) The purity of MagChem 10 WTS 60 has not varied significantly from December 2004 through December 2005 to the latest 12 month period.

These values also indicate that Martin Marietta has been successful in maintaining the MgO purity within their stated goal (98% to 98.5% by weight) for the manufacturing process over a multi-year period.

Mr. Juan Reyes

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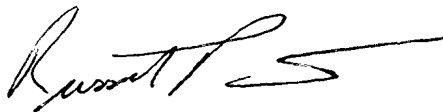
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Trace contaminants of Fe, Si, and Al are the largest contributors to the unreactive phases in MagChem 10 WTS 60. All of the Fe, Si, and Al come from the dolime with a trace amount of Si from the solid fuel burned in the kiln. The rotary kiln process used for the manufacture of the MgO for product MagChem 10 WTS 60 has remained unchanged since production began in 1969. The same raw materials are used and the chemistry has remained consistent from 1969 to the present. There are no plans for any modifications to the system that would have any impact on the current MagChem 10 WTS 60 quality.

We believe that the attached information provides supportable evidence for the stability of the feed stock and finished product chemistry for MagChem 10 WTS 60, along with the vendors' ability to maintain this level of quality throughout the expected operational period of the WIPP.

If you have any additional questions, please contact me at 505-234-7457.

Sincerely,



Russell Patterson
Compliance Certification Manager

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